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R. Dawson, R.I.A., F.F.C.S., F.C.I. (Eng.), Secretary-Manager and Editor

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• EDITORIAL •

"Pay as You Earn" Income Tax Plan

More and more the general public are becoming acquainted with the proposition contained in the Rumpl or "pay as you earn" income tax plan. This plan provides for the payment of income tax as income is earned, instead of paying on the income earned the previous year. Indeed, the plan has real merit and judging by the interest created by the proposal, many others are thinking along similar lines.

Many people, however, are inclined to think that the Government would lose considerable revenue if this plan was adopted, but this is far from the truth. If the war ended this month and we had a business slump, how would the unemployed find money to pay back income tax? As a matter of fact, they would be earning nothing and consequently no deductions could be made.

Moreover, quite a number of people have not yet completed paying on 1940-41 income tax, and in some cases the date goes even further back. We can see no difficulty in giving effect to the proposals of this plan, and frankly cannot see where the Government would lose anything by its adoption.

The Canadian Manufacturers' Association in its Circular No. 1315 points out four very distinct advantages in this "pay as you earn" plan as follows:—

1. Wage and salary earners, in many cases, may receive reduced earnings sometime during the post-war period, and under the present income tax system they will have an income tax liability over their heads, which will be a debt they are expected to meet, but with reduced earnings out of which to pay it. Most industrial wage-earners are affected by income tax now, and it is estimated that 1,600,000 individuals will pay income tax for 1942.

2. The wage-earner or other income taxpayer who retires on a pension which is much less than his previous earnings would have a similar problem, in that he will have to meet a large income tax liability out of a pension which is relatively smaller.

3. Similarly, in the case of the death of a taxpayer, his estate will have to meet the income tax liability for his last year's income, whereas under the "pay as you earn" plan, there will be very little liability unpaid.

4. Another point which will appeal to workers is that under the "pay as you earn" plan, the tax deductions will be made on the very same income which is being taxed, so that the deductions will more closely approximate the actual tax than under the present plan. Under the present plan, a man may have deductions based on a large income, and yet his tax, being on the previous income, is small, or vice versa.

We believe, with the C.M.A., that the adoption of this plan would relieve from thousands of people the burden of debt which is likely to become worse immediately following the cessation of hostilities.

Across the Secretary's Desk

As these lines are being written there are many items of interest coming across the secretary's desk, Christmas cards galore from both old and new friends make one feel that being the National Secretary of an organization such as this, even with all its trials, is worthwhile.

We close the year 1942 with a very definite increase in members which is likely to continue unabated in the future. The increase is not spectacular but it is steady, which is probably all to the good, and attendances at most Chapter meetings have been a source of inspiration.

In Kitchener on December 16th there were 28 for a dinner meeting—a new diversion for this Chapter. At Hamilton on the same evening there were 55 for the dinner and over 80 for the meeting. Recently in London about 25 attended the meeting, and when one considers how industrial accountants are compelled to work extra hours particularly at this time of the year, these attendances are very gratifying.

Among the cards received over this desk some are from members in the armed forces, and it is good indeed to know that these boys do not forget us, even after they have ceased to attend our meetings for the duration.

At the December meeting of the Hamilton Chapter a student, now in the R.C.A.F., was present. This young man arrived home on leave the day before from the West, and one of the first things he did was to call at this office to extend greetings. It is indeed a pleasure to report such happenings and we shall be glad to hear particularly from the boys in the various services at any time.

The coming year, despite the war, should bring us to new heights so far as membership is concerned, but in the last analysis it is still up to every member to do his, or her, part if we hope to fulfill our ambitions, and judging from what has happened in the past we know you will not fail.

And so to every one of you we extend the very best wishes for a happy, prosperous and victorious New Year.

R. D.

Chapter Notes

Hamilton Chapter.

Fifty-five members and guests attended the dinner at the December meeting of the Hamilton Chapter, and about thirty more were present for the meeting. They heard an extremely able talk by Mr. J. M. Thompson, C.A., Assistant Comptroller of the Canadian Westinghouse Company Limited on the subject "Basic Payroll Methods". Mr. Thompson outlined the main

payroll methods and illustrated his talk with numerous forms, which added to the interest of his hearers.

Mr. Thompson was introduced by F. J. Purdon and after the discussion period was given a standing vote of thanks, moved by W. L. McMahon.

Kitchener Chapter:

There was a good attendance at the December meeting of the Kitchener Chapter, held at the Preston Springs Hotel in Preston where the speaker was Mr. E. D. Graham of Stevenson & Kellogg Limited. Mr. Graham spoke on the "Art of Management" and at the close there was quite a lengthy discussion period which testified to the extreme interest of those present on the subject.

Niagara Chapter.

Due to very bad weather the attendance at the December meeting of the Niagara District Chapter was not up to standard. Those who did attend, however, heard an extremely fine talk on "A Controller's Commentaries on Cost-Plus Contracts".

The speaker was Mr. J. P. Healey, Controller of the Curtis-Wright Corporation in Buffalo, N.Y., and he proved to be one of the best speakers ever heard by this Chapter.

Fort William-Port Arthur Chapter:

The December meeting of the Fort William-Port Arthur Chapter was a most successful affair. It was a dinner meeting at the Royal Edward Hotel in Fort William and was largely a social meeting with actual business kept down to a minimum. The members were entertained by a member in the person of C. N. Parsons, who turned out to be a most accomplished magician and ventriloquist and his various acts went over in a big way.

Thirty-four members were present and there is no doubt but that they certainly became better acquainted with each other as a result of this meeting.

New Members

Hamilton Chapter.

B. D. Davidson, Firestone Tire & Rubber Co., Ltd.
F. A. Lee, Firestone Tire & Rubber Co., Ltd.
A. Wright, Firestone Tire & Rubber Co., Ltd.
J. L. Kemp, Cockshutt Plow Co., Ltd., Brantford.
C. Brown, Otis-Fensom Elevator Co., Ltd.
Geo. Clegg, Otis-Fensom Elevator Co., Ltd.
W. Anderson, Otis-Fensom Elevator Co., Ltd.
K. Rusk, Otis-Fensom Elevator Co., Ltd.
A. Gable, Canadian Westinhouse Co., Ltd.
S. L. Heaton, The B. Greening Wire Co., Ltd.

Windsor Chapter.

H. G. Leader, Brant Pattern Works.
G. L. Atkinson, Chrysler Corporation of Canada.
A. R. Bruce, Chrysler Corporation of Canada.

L. V. Bensette, Chrysler Corporation of Canada.
J. Birnbaum, Border City Industries Ltd.
T. G. Richmont, Stokely Van Camp of Canada Ltd.
C. N. McRobb, War Time Housing Limited.

Niagara Chapter:

G. A. Elliott, Foster-Wheeler Limited.
W. Shuh, Packard Electric Limited.
E. R. Kalls, McKinnon-Columbus Chain Co., Ltd.

Ottawa Chapter.

G. S. Whyte, J. R. Booth Limited.
R. W. Stark, Renfrew Electric & Refrigerator Co.

Fort William-Port Arthur Chapter.

John Bodner, Coslett Machinery & Equipment Co.
A. C. Bendell, Thunder Bay Paper Co., Ltd.
Charlotte M. Eastwick, Northern Engineering Co.
R. K. Piper, R. S. Piper & Sons.
H. B. Sinfield, Paterson Steamships Limited.
G. P. Smith, G. P. Smith Company.
Bruce Grant, Ogilvies Limited.
P. S. Goods, Canada Car & Foundry Co.

Vancouver Chapter.

H. J. Burns, Boeing Aircraft of Canada Limited.

Toronto Chapter.

D. A. Ridout, W. A. Gilbey Ltd., New Toronto, Ont.
C. J. Dutton, Luckett Loose Leaf Co., Ltd.
J. L. Gioux, Cook Co., Ltd.
J. B. Veitch, Treasury-Cost Section.
A. J. A. Simmons, Canada Wire & Cable Co., Ltd.
D. M. Keegan, Canadian Pacific Railway Co.
E. Burwash, Sangamo Co., Ltd.
J. W. Parr Sangamo Co., Ltd.
F. B. Weaver, c/o C. B. Taylor.
A. W. MacGregor, Trutred (Canada) Ltd.
B. E. Carroll, Service Station Equipment Ltd.
J. D. Crocker, Canadian Sales Check Book Co., Ltd.
J. F. Mulligan, Viceroy Manufacturing Co., Ltd.
T. J. Scott, Rogers Majestic Ltd.
M. J. Vanner, Belleville-Sargant Co., Ltd., Belleville.
J. D. Godwin, Reliance Aircraft & Tool Ltd., Belleville.
A. J. Counsell, Reliance Aircraft & Tool Ltd., Belleville.
D. B. Munro, Reliance Aircraft & Tool Ltd., Belleville.
B. B. Puddy, Reliance Aircraft & Tool Ltd., Belleville.
G. Hill, Reliance Aircraft & Tool Ltd., Belleville.
A. P. Johnstone, Reliance Aircraft & Tool Ltd., Belleville.
R. B. Moran, Neff, Robertson & Co., Toronto.
J. C. Keais, John Inglis Co., Ltd.
D. T. Jackman, DeHaviland Aircraft of Canada Ltd.
I. C. Calder, Sutton-Horsley Ltd.
J. R. McLachlan, Treasury-Cost Section.

D. McIvor, Kent McClain & Cameron Ltd.
G. Mason, General Engineering Co., Ltd.
N. Sillito, Canada Foil Ltd.
G. Sheridan, Direct Factory Sales Ltd.

Literature Received

Use of Cost Standards.

The Australian Accountant, December.

A splendid article dealing with the use of standards in War Time.

Some Practical Problems and Recent Developments in Cost Governing Contracts.

N.A.C.A., November 15th.

This is a most complete and instructive article on methods employed in costing government contracts in the United States.

Struggles With Standards.

Suggested Procedures for the Issuance and Control of Procedures.

N.A.C.A., December 1st.

Here are two articles of interest dealing with the simplification of standards and procedures in these difficult days.

Accounting and Cost Problems Under Price Control Regulations.

N.Y.C.P.A., November.

A most complete article dealing with accounting and cost problems under price control regulations in the United States.

Inventory Reserves and Excess Profits Tax.

Canadian Chartered Accountant, December.

A most welcome article on a subject concerning which too little has been written.

Time Study Procedure.

Factory Management and Maintenance, December.

A quick course in the fundamentals of good time study practices with forms and illustrations.

Costing on War Production Orders

Copy of Address Delivered Before The Cost and Management Institute, Friday, October 16, 1942

By GORDON CHENEY

It is a very great privilege to be invited to speak to you to-night and I assure you I very much appreciate the opportunity. However, I feel more than a little apprehensive on one point. As I have always understood that it is good policy to commence a talk such as this with a story, possibly in this manner I might better illustrate my apprehension. This was told I believe by Sir Edward Beatty who said, "When I was young, my people

planned that I should become a minister of the church, but somehow I turned out to be a railroader. However, I trust that my parents were not too disappointed, because I feel that railroading and the church are very closely related. They both use the same language."

Now, my point is this: while I am sure we speak the same language, I am more than a little apprehensive of addressing you on "costing", a matter which is purely of the commercial world, in all its aspects, when I am a permanent civil servant, an employee of an organization called "government" which, according at least to its critics, never "gives a hoot' what anything costs.

However, notwithstanding all this, I think that we, in the Treasury Cost Division are in an ideal position to observe the operations of industry, particularly as regards cost accounting. Our work brings us into direct and close contact with not one contractor or industry, but practically all of them at one time or another. On the other hand, with this widespread contact and the resulting information, and considering our position as a government department, it is possible for us to study an industry as a whole from a position practically as remote as our contact is close and direct. And if you don't believe me when I say "remote" ask any contractor who has tried to locate someone in our Temporary Wartime building.

You have asked me to speak to you on "Costing on War Production Orders." That, in itself, is a rather large order—war or otherwise. To take care of it literally and adequately would take considerably more time than I have at my disposal. I am afraid, therefore, that I shall have to treat this subject at least partly on a basis that is more general than specific. To do so, I propose to divide this talk into three sections, each dealing with a topic which I think will be of interest to you. These three sections might be entitled:

The Treasury Cost Division,
Costing Methods,
A Few Criticisms and Suggestions.

I hope you will pardon my placing our organization at the head of the list, in that I do so with a purpose. I think you will agree, that in order to understand our views, expressed from the standpoint of a government organization, you should have some knowledge of the origin, duties, responsibilities and makeup of this organization.

The Treasury Cost Division is a part of the Comptroller of the Treasury's Branch of the Department of Finance. The Comptroller of the Treasury is an official of the Department of Finance charged, by Act of Parliament, with certain duties in regard to the control of the issue of monies from the Consolidated Revenue Fund. In order to clear up a misunderstanding often encountered, I might emphasize that we have no direct relationship with Treasury Board which is a committee of the Privy Council, made up of Cabinet Ministers, dealing mainly with matters of finance, revenue, expenditure, and public accounts referred to it by the Privy Council. Further, I hope and believe that we are in no way connected with that favourite topic of newspaper men, "The Dead Hand of Treasury Control". I must confess that I am not at all sure of the meaning of the phrase or to what organiza-

tion it applies, but if sincerity of effort means anything, it does not apply to us.

I do not propose to tell you a great deal about our methods as at best it would be a rather burdensome recital of detail, (in any event, I assume that many of you are already familiar with them). A brief outline of how our organization originated might assist you in gaining understanding and particularly will supply the answer to a question often asked: "Why are cost audits carried out by a branch of the Department of Finance rather than by the Department of Munitions and Supply or the Auditor-General?"

Prior to the war, audit of the few cost plus contracts in existence was carried out by Department of National Defence, the Comptroller of the Treasury and the Auditor General as their interests appeared. Early in the war, with the tremendous increase in contracts requiring audit and with the formation of the three Defence departments as well as Munitions and Supply, it was realized that some centralization was necessary. If the work was carried on as in the past, it was possible that a contractor might be audited by 6 different sets of auditors in addition to tax auditors and the company's own auditors. As a result, all of the interested departments agreed that a single audit organization under the Comptroller of the Treasury would be set up to act as a service branch, that is, to carry out required audits and to furnish reports and other information to the departments concerned. (The Auditor-General, of course, retained the right to re-examine the costs of any contract as he may see fit). Thus the Treasury Cost Division was formed and its services are now available to any government department.

I think that it would be well if I dealt for a moment with our duties. In my opinion we have two, the first being to carry out such audits as are required either by the terms of a contract or as a result of the administrative department which in practically all cases is the Department of Munitions and Supply, reporting thereon in such a manner as will clearly and intelligently reflect the costs of the contract and bringing out all extraordinary items of cost which might not be clearly defined by the terms of the relevant contract. I draw particular attention to the fact that we have no authority to approve or disapprove of any item of cost with the exception of certain specified costs definitely excluded by the terms of M. & S. Form 433 which was issued under authority of the Department of Munitions and Supply and usually forms part of the contract under audit. To summarize, we carry out the audit and report thereon, submitting our report to the administrative department. It is the responsibility of that administrative department to approve or to disapprove of the costs reported either in total or in the case of specific items making up the total.

The second duty arises from the terms of the Consolidated Revenue and Audit Act, which act amongst other things defines the position and duties of the Comptroller of the Treasury. The act implies that the Comptroller may decline payment of any account on various grounds, one of which is that the amount is not justly due. In the event, therefore, that it is our opinion that the costs allowed by the administrative department are such that should be challenged upon covering account being presented for payment, it is our duty, as officials of his branch, to report this fact to the

Comptroller. If, as a result, he declines payment, the administrative department's only recourse is an appeal to Treasury Board, whose decision is final.

Considering these two duties together we find that while we have no authority to approve or disapprove costs, we have a duty of protecting the public against the disbursing of public funds in payment of accounts containing improper costs.

Now, the organization of the Cost Division. We have at present a staff of 300 all told across Canada, in Ottawa, in District Offices, as field or travelling staff, and as resident auditors in many of the larger plants and projects. Headquarters in Ottawa is made up of the Chief Cost Accountant, Assistant Chief Cost Accountant and 6 Sections dealing respectively with contracts for Aircraft, Construction, Munitions, Shipbuilding, Textiles and General, together with administrative staff. There are 11 District Offices located in Newfoundland, Halifax, St. John, Montreal, Ottawa, Toronto, Windsor, Winnipeg, Calgary, Vancouver and Victoria. These offices, in some cases, consist of one general office and supervisor carrying out audits for all the various headquarters sections. Others have an organization similar to headquarters with a separate district supervisor and staff for the work of each of the individual headquarters sections. The set up of the quantity and variety of contracts operating in the locality. From my rather sketchy description, I hope you have gathered some idea of our background for now we come to the second section, that is: "Costing Methods."

With the organization I have outlined we are endeavouring to carry out audits on a scale hitherto undreamed of. When you consider that there have been let since the beginning of the war more than five billion dollars worth of war contracts covering practically any type of goods you can think of, and that a goodly percentage of these contracts are subject to audit, you will have some idea of what we are up against. You will understand, therefore, that our method of attack must, of necessity, be one of comprehensive test and analysis rather than complete vouching. It will be immediately apparent that in order to carry out audits on this basis we must primarily be satisfied that the costing system in use by a contractor is such as will produce accurate costs and will enable verification of this accuracy with some degree of facility.

I might emphasize that we do not require contractors to use any specific cost system. Our policy has been, generally, not to disturb the contractor's present system which, presumably, he has found most satisfactory for his type of business. However, if it appears that his system will not produce accurate costs or is objectionable in any specific feature, we point this out to him and expect him to correct the situation. In surveying cost systems, however, we try to keep one point always in mind and that is that, while we must have accuracy, consideration must be given to the amount of detailed information desired in the light of the possible effect on production caused by the obtaining of this information. In all systems we must insist, as a minimum requirement, that labour and material be properly recorded, separately for each type of goods, and further, if possible, that recording be in such a manner as will indicate the trend of efficiency.

With regard to costing methods, you have asked me to speak on "Costing on War Production Orders." As I have previously pointed out, there

is a tremendous number of orders covering a multiplicity of types of goods and accordingly, a great many costing systems in use. We may find, jobs costs, standard costs, process costs in all of their many variations and to atempt to make any study which would be worth while, would take considerably longer than you would care to listen or than I would attempt to speak.

Further, I hope you have noticed that I studiously avoid quoting statistics. Not only are they uninteresting, in quantity, but are more otten than not misleading. I think the latest example of this was quoted in a recent Reader's Digest which spoke of the case of the ten young ladies—one of whom was pregnant while nine were virgins. It was pointed out that the statistician would probably say that on the average the nine virgins were ten per cent pregnant, while the young lady expecting the baby was 90 per cent a virgin.

When I began preparing this address, it became immediately apparent that in view of the scope some "paring down" of the subject matter would be necessary. It occurred to me that the industries engaged on war contracts might be divided into two groups as follows:

(1) Those with extensive pre-war experience.

(2) Those with comparatively little or no pre-war experience.

Generally with the former, satisfactory cost systems were available and subject to the increased use of mechanical equipment were capable of taking care of increased production. With the latter, such is not the case. Some systems were available and stood up under the strain. Where goods produced were similar in type or manufacturing process to peace time goods, the system in use in the peace time industry was satisfactorily copied, but in others this was not possible. Either the peace time system did not stand the strain of increased production or there was no system immediately available for copying, in which case some considerable difficulty has been and is being encountered.

This is where I felt I might take the liberty of "paring down" my subject. Costing methods operating successfully, are generally well known, while those not functioning so well are usually not discussed. With your permission I am going to reverse this procedure and discuss some of the methods used and in use in what is probably the largest new industry and certainly the largest industry of those encountering serious costing difficulties, that is the aircraft industry.

In pre-war days an aircraft industry existed, but barely that. Production was small, made up of a comparatively few wood or metal framed and fabric covered aircraft, which were, in comparison with to-day's methods, practically hand carved. It was in most cases a constant struggle to remain solvent and red ink figures were continuously encountered. Cost systems, when used, were comparatively simple the job costing method by units being followed.

In the early 1930's, the United States government together with all of the aircract manufacturers in that country agreed upon a uniform system of general accounting for that industry. While a uniform system of cost accounting was not agreed upon probably some ground work was laid. Canada missed a golden opportunity to do something similar in 1937-38-39,

when first contracts were let for manufacture of operational aircraft in Canada. The quantities were small, 17, 18, 28 aircraft, and for the most part were on the basis of cost plus 10%. Possibly, because of the fact that the contracts were on this basis and also because no other work was carried out in these factories and accordingly the government paid all costs, practically no cost accounting records were kept. The government took physical possession of materials in stock, instituted controls over practically every phase of the work and in the end divided the total cost by the number of aircraft to obtain unit costs. While invaluable experience was gained by contractors in building metal aircraft, insofar as costing information and knowledge is concerned, the contracts were more or less a dead loss.

The next phase was the early war period. Contracts were issued for such quantities as 89, 90, 100 aircraft. Contractors commenced costing on the basis previously used, that is job costing from the smallest part to the finished plane. A twin-engined bomber had from 12 to 15 thousand parts, made from as many types of material, individually costed with a cost card for each part.

The method generally in use was to cost individually each detail part or "bit and piece" as they are known to the initiate. By transferring the cost of the necessary parts and adding that of assembly, the cost of a minor assembly was ascertained. By repeating this action with minor assemblies a major assembly cost was obtained and by going one step further in the same manner a component cost was obtained. Finally by adding the cost of final assembly and installation ot the ascertined cost of the proper number of components, a cost per completed aircraft resulted. Everything began, of course, with a priced material requisition and distribution of workmen's time. With the increased use of machines this method was continued, but even so, with new and untrained staff, you can realize the room for human element error. Although, on the whole, better results were obtained than might be normally expected from such a system. However, in the first year or so of war it was a real surprise to find costs balancing with control accounts, that is, if you were lucky enough to find control accounts. To carry out an audit at that time was a bit of an undertaking.

On top of this quantities ordered began to step up to 200, 400, 500 aircraft. At the same time expansion of all war industries was in rapid process and as a result the well-known difficulty of obtaining efficient staff became a real factor in every phase of industry. It became apparent, quite rapidly, that the system outlined could not possibly continue to function and enquiries were made to obtain a better one. Visits were made to the United States. More exchanges of information took place between contractors, but it was apparent quite early that different opinions as to systems were held in different plants. Basically the general trend was to cost by components only, eliminating all costing in detail of anything smaller. This, generally, was the system found in use in the United States and was applied in Canada with some variations. It is still in use in some plants but has varied considerably in method employed to obtain the final result.

The radical departures from the pre-war method, however, came with further increase in production caused by contracts issuing for cumulative quantities of aircraft passing the 1,000 mark, together with the fact that

larger and more detailed aircraft were being made. With the staff situation more than ever acute and the increasing difficulty of obtaining additional mechanical equipment, it became apparent that detail work must be cut down. Which brings us up to the present or very recent past.

Very careful consideration was given by manufacturers to the methods of recording and accumulating the elements of cost with the result that some very definite changes were made. These changes for the most part affected material costs. We now have material costs arrived at still by components, but instead of originating from individual priced material requisitions, costs are arrived at mainly in the following manner:

(1) Where experience warrants, by standard costs with variation account or other method of verification of accuracy.
(2) By bill of material priced at actual cost.
(3) By bill of material priced at standard costs with a variation account to take care of this factor.

I might explain here that costing by means of a bill of material was literally impossible in the early war years in that planes made were all of foreign origin and great difficulty was always met in obtaining complete data, drawings, etc., necessary to such procedure. While we are still manufacturing planes of foreign design the difficulty I mentioned has to some extent been overcome. The saving in detailed work as a result of the changed methods is obvious and when one considers that in our larger plants, possibly 15,000 material items per month are involved, some idea of extent may be obtained.

With regard to labour costs, with one exception, accumulation by components in the old manner continued. The exception is in one plant where costs are accumulated under radically different headings both as regards material and labour. Costs are accumulated, by contracts, under the following headings:

(1) Detail parts made in sheet metal shop, wood shop, fabric shop or machine shop, in total by shops.
(2) General sub-assembly work in total.
(3) Major sub-assembly work in total for batches of 10.
(4) Component assembly under 4 main components by units.
(5) Final assembly under 4 main components by units.

The advantages claimed for this system are that not only does it eliminate much costing detail, but as regards detail parts and sub-assembly work, items belonging to different components may be grouped for production purposes this grouping, of course, not being possible when costing by components is practised.

Distribution of overhead cost has practically always been on the basis of productive labour money value, possibly as a result of the fact that it has been advocated by us as being the most practical and reasonable method. I feel that it may be applied especially well in the aircraft industry because of the fact that, generally, each plant produces, or will produce, one type of aircraft, only. Further, in view of the fact that a goodly quantity of spare parts are ordered with each quantity of aircraft, a balanced production, necessary for effective and fair use of this method of apportionment, results.

To consider for a moment this costing picture on the whole, you might

well ask "Are the aircraft contractors being allowed to institute systems or changes as they see fit?" or "From the variety of methods in force it would appear that no effort is being made to standardize. Is this so?" The first question is answered by my previous statement that we do not interfere with the contractor's costing methods so long as they will efficiently and accurately produce the information which we require. As for standardization, there is much more involved.

First, of course, is the fact that the industry has comparatively little history and experience to draw on. Then there is the fact that aircraft are constantly being modified and improved, eventually and quickly to become obsolete and be replaced in production by new types and also that in view of the variety of types produced, comparative costs are of little value. Then, there is the further fact that, in Canada, we are building, almost entirely, types designed elsewhere with the consequent difficulties in the way of obtaining promptly drawings, material lists and other information. While, on the whole, the best method appears to be costing by components, with labour accumulated accordingly and with material on a priced bill of material basis, in view of all these points, there is no certainty that it is the best. Moreover, the aircraft industry is made up of young people. They are full of ideas. It is constantly changing; possibly it may be best described as "surging". I think that we realize this full well and have realized it for some time with the result that, consistent with our duty to protect the public, we have fostered the new ideas and the development of the ability to produce these ideas. I confidently expect that some day in the future, and not too distant future, there will develop in this industry costing methods which in efficiency and accuracy will compare with any.

So far, I have spoken only of the manufacture of aircraft, but, there is another phase of the industry which is expanding so rapidly that it bids fair to surpass the manufacturing phase, in volume, at any time. I refer to the overhaul and repair of aircraft. There are two main types of overhaul and repair jobs, those required as a result of a crash and those which are carried out automatically after an aircraft has been in the air a certain number of hours. This latter overhaul is based on the same theory as that under which you overhaul your motor car after a certain mileage has been covered, that is the theory of diminishing safety factor.

Prior to the war, with the limited number of aircraft in the country, overhaul work, outside of the owner's hangar, was negligible. Such work as was costed was on the basis of job costs per aircraft. Even in the early days of the war, no great increase was apparent, but, with the Air Training Plan getting into full swing, and the number of available aircraft ever increasing, the necessity for plants given entirely to overhaul work became an immediate problem. Such plants were located or erected and contracts, for obvious reasons on a cost plus basis, were issued. The operators of these plants were drawn from either the regular aircraft manufacturers or the various air transport lines operating in the country. There are at present about 40 of these full time overhaul plants, employing from 200-2,000 persons each, and equipped to do their respective jobs even to the extent of making necessary parts in an emergency. Further, the likelihood is that this number will increase rapidly to possibly 100 plants.

My reason for discussing repair and overhaul is mainly to round out the picture of the aircraft industry, therefore, I don't propose to say a great deal about costing in these plants. Costing on a unit job cost basis is in effect and is standard throughout the industry. However the number of units received for overhaul is constantly growing and it is apparent that the present method of overhauling each unit separately may have to be discarded for some more rapid production method. Possibly this may come in the form of a production line with aircraft being delivered in batches and overhauled and costed in such batches rather than individually. It may be that the aircraft will be broken down and enter the plant as a wing, fuselage, or tail unit or a batch of these components. The important point is that we have considerable forewarning that changes will be necessary in production methods and therefore possibly in costing. For many reasons, involving, parliamentary appropriations, United Nations participating in costs, and not the least, for comparative purposes, standardization of method is essential. We have had a very good start in this case, and fortunately the main difficulties confronting the aircraft manufacturers do not apply to overhaul work. Any troubles that we have have been mainly caused by misunderstanding or lack of efficiency rather than any falling down of systems. I feel therefore that it is safe to assume, that while this large and ever-growing phase of the industry will require constant attention, no great difficulty as regards costing may be expected.

My object in presenting this rather sketchy outline of costing methods used in the aircraft industry has been to portray to you some idea of what we are up against in war industries generally and also to reflect the attitude which we have adopted. As I have explained we have a vital interest in systems used or proposed. We do not exercise control over the systems followed but we do help shape them. Because of our rather unique position we can be of great assistance to contractors in this regard. Many contractors realize this and are quick to take advantage by consulting us with regard to new or changing methods. The results are to our mutual advantage, and I hope that more and more will do so in the future.

The final section of my talk is quite brief and is something of an afterthought. I felt that you might be interested in two or three main criticisms directed at ourselves or the government generally in regard to our work, together with what in my opinion are the answers. Then, and I hope you won't hold it against me, I propose to make a few suggestions to you gentlemen as accountants and particularly as representatives of industry.

Insofar as criticism is concerned, I am quite sure that more has been levelled at M. & S. Form 433, with which I assume you are all familiar, than at any other single point having to do with cost audits. It is doubtful if it completely satisfies any one, but I also doubt if any one of the dissatisfied individuals, if placed in the government's position, could make any major improvement. It was formulated by senior officials of several government departments, with some outstanding Canadian Public Accountants lending their advice, and was based on a combination of British, United States and Canadian methods adapted to Canadian practice. It is realized that its terms cause inequalities but to alter them would weaken the intent and would undoubtedly cause further inequalities. The only recourse has

been for contractors to appeal to the Department of Munitions and Supply who, if convinced, adjust these inequalities, not by altering M. & S. Form 433 but by adjusting the amount of profit allowed under the terms of the contract. A United States speaker once said in reference to government contracts, "Cost to the government is not actual cost to the contractor but rather the actual cost of benefit to the government". Be that as it may, I am of the opinion that M. & S. Form 433 serves very well the purpose for which it was designed.

Another criticism is often advanced in the form of a question, "Why go to all the expense of trying to limit profit by means of cost audits when the excess profits tax does the job in any event?" Oddly enough, the answer does not concern control of profit greatly, but rather control of cost. Cost plus contracts, in any form, are notorious for their tendency to release the brakes on expenditure. It is elementary, of course, that our audits are carried out for the purpose of ensuring that cost, as charged to the government, is fair and reasonable. The answer to the question, therefore, is that an excess profits tax can never achieve control of extravagance, nor can it promote efficiency.

The third criticism is one which, contrary to the previous two, is more or less selfimposed. It is a matter of which we have been aware for some time, but is beyond our control. It is the result of a situation of which we are most emphatically aware, and no doubt you are also, that is, the acute shortage of capable men. The point is that there are too few technical officials of the administrative department (generally the Department of Munitions and Supply) stationed in contractors' plants. As a result, while we can verify the accuracy and generally the honesty of the contractors' costs, there is difficulty in verifying the efficiency behind them. Comparisons are not always available and, if they are, quite often lead to indefinite conclusions. It is possible to verify reasonably man hours, labour and material cost but it is also quite possible for contractors to employ unnecessary productive and overhead staff, to work and pay for unnecessary overtime, etc., with a consequent charge to government contract costs. Such an overcharge would be practically impossible for us to discover, from the records usually available, and could only be discovered by a wide-awake technical man stationed more or less constantly in the contractor's plant. The remedy for the situation is obviously more men, but it is also obvious that the obtaining of capable men is next to impossible. Although constant effort is being exerted, so long as the present shortage exists improvement in the situation will be slow. In the meantime we must make the very best use of such information as it is possible for us to obtain.

I include this criticism, not only because I consider it to be one of the most important at present, but also, in case you have detected a note of complacency, to indicate to you that we are not at all satisfied that we are doing the perfect job. As in every job, and particularly in the light of our many contacts with industry, we realize that there is always room for improvement. We are and shall be constantly striving toward that end. Constructive criticism is of great assistance to us in our endeavours and we welcome it accordingly.

I hope that you gentlemen as representatives of industry are equally

agreeable to accepting suggestions because I am going to make a few. The first one is with regard to your dealings with the government, and particularly with us. To my knowledge our dealings with industry to date have revealed generally fine co-operation and have taken place in an atmosphere of friendliness. This is particularly evident with firms with which we have been dealing for some time. However, nothing is ever perfect and there appears every now and again some evidence of distrust or lack of co-operation. My suggestion is this—it is quite common in commercial practice to make certain concessions to your best customer, and there can be no doubt about who is your best customer to-day. The only concession asked is your co-operation. It is unnecessary to say that you have nothing to fear unless there are some skeletons in your closets.

Now, this may be an impertinence, but if so, I must risk it. One of the most often recurring faults we have to find with industry to-day is a remarkably simple one. Senior officials and executives apparently do not read their contracts. It would appear that in most cases one or two executives negotiate a contract and are more or less thoroughly familiar with it. However, it would seem that comptrollers, chief accountants, cost accountants and other senior officials do not obtain a thorough knowledge of these contracts but either give the contract a fleeting glance or depend on a verbal condensation.

This results in a great waste of time through misunderstanding, improperly prepared progress payment claims, improper costing methods, either by virtue of excessive or insufficient information, and leads to unnecessary arguments, delays, in payment and in final settlement, and generally causes friction instead of co-operation.

The remedy is simple. Read your contracts and read them thoroughly. Even if you read only the part in which you personally are interested—price, costing, progress payment clauses, etc.,—read it and know it well.

Here is something further to think about. We Treasury Officials are often referred to as "guardians of the public purse." Does it ever occur to you that you are "guardians of the public purse" also? You are probably engaged on work paid for directly or indirectly with public funds. Have you considered that every time you eliminate or cut down unnecessary costs that you have acted as a "guardian of the public purse." The only unfortunate part is that you are not paid for acting in this capacity but you are penalized by heavier taxes if you fail in it.

Finally, in all of this talk, I have said nothing which would indicate the use of cost accounting systems for any other purpose but that of price-fixing. While that is not entirely true, I am afraid that it is true to a much greater extent than it should be. I know definitely of plants where the information produced by the costing system is never, and I say that with assurance, never used for any other purpose than price-fixing. I know of comparatively few cases where it is used extensively. What is the reason for this failure either to provide information or to take advantage of that which is provided? Is it because of the difficulty of obtaining suitable staff or equipment? Is it the demoralizing influence of cost plus contracts? Or is it that a harried management under a heavy burden of war work is interested only in trying to get goods out the door regardless of the fact that

costs might be lowered and production improved by the judicious use of information available. Possibly all three and more are factors. Whatever the reason, I am afraid that there is a distinct tendency in our war industries to make the cost accountant into a historian, a recorder after-the-fact of someone else's performance. This is something you must guard against, work against constantly. Ensure that you are in a position to supply useful information. Supply it in a manner that demands attention and so far as you can, see that it receives attention. You are in one of the best possible positions to aid your war-burdened management and by doing so you will not only aid your own business but will really help the war effort. One further thought—the future is coming, a future which may bring good times or bad, but in either case they will probably be highly competitive times. Now is the time to build efficiency to meet that competition, efficiency of the individual and of the organization. By doing so, you will not only build for the future but you will be co-operating in the present to ensure that there will be that kind of future which we are striving for with all our energy.

Factory Costing

By A. GREENHILL, F.F.I.A.

Being a Lecture delivered to the Accountants' and Secretaries' Educational Society, Brisbane

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PART II—WAGES AND MATERIALS

Wages represents the next element of cost and the next section of our cost statement. The wages sheet must be carefully analyzed to secure the information necessary to compile the section of our cost statement, which contains the wages and salaries group or overhead expenses. What remains represents wages directly expended on production, although it may not be totally composed of what would be regarded as productive labour. Certain labourers are employed at all factories, and they do not necessarily return time records showing which jobs they have worked on. I shall have a lot to say about wages a little later, but for purposes of our cost statement, the foregoing is sufficient.

MATERIALS

The third section of the cost statement is materials.

These also are ascertained with not too much difficulty for the present purpose at any rate, but I want to remind you that we are merely, at the present time, operating on the financial accounts of the year just closed, and any information we have is only what those accounts disclose to us, so that ignoring the factor of made up and partly made up stocks, we must regard the materials used during the period being reviewed, as the net remainder after having added together the original opening stock and the purchases, and taken away the stock remaining at the end of the period. As regards materials, I shall have a good deal to say later, also.

We have now come to the end of the preliminary preparation of my special statement compiled entirely from the trading and profit and loss account of last year—it shows us under three main heads our total overhead, our total wages and our total materials expenditure. From their combined total, we deduct the sundry credits which have come into the profit and loss account by way of bad debts recovered, rents and interests received, etc., and the net final figure is referred to as the total cost of goods sold.

Against this final total, we set the sales of the period, and by subtraction, we show the trading results of the year. It also shows us the net trading result of each section of the business. In different businesses it could be made, by suitable adaption, to show the same results with respect to separate products, and its usefulness, when I tell you that we are from now onwards going to prepare it each month, must obviously be enormous.

The results shown from our statement are quite a little illuminating, and while the business appears to be quite a healthy one on the final figures produced, it is suddenly revealed that one department at any rate, is doing very badly—still, as I said before, this preliminary statement is merely a guiding factor upon which the accountant will be able to frame his costs.

THE FIRST STEP OF THE NEW FINANCIAL YEAR

In setting out to face the new financial year, the co-operation must be invoked of those in authority—that would be the principals of the firm, the factory managers and the sales managers. The sales managers make their contribution by setting out what they anticipate they are going to sell during the ensuing period.

We must remember that the type of business we are dealing with is not one where a certain number of units can be made up in accordance with a program, and then the sales staff be driven along to dispose of those units, as in this particular type of business, the product is not of a uniform nature and depends entirely upon the sales of other people to a great extent. Thus, while one factory sets out to sell bathing costumes and makes 10,000 of a standard product in the period, that cannot be done with respect to motor bodies produced under local conditions, where it can only be roughly estimated what the various distributors are likely to sell, so that for all normal purposes, the output is going to be governed by the contracts in hand and what we anticipate will be forthcoming. Thus, it is not possible to make a complete and proper budget in a business of this type, but the best we can do is to be sure that the ratio of expenses remains proportionate to the amount of business actually done. However, we must try, and the sales manager will be called upon to tell all he can regarding the prospects of maintaining the sales of the last period or whether he expects, on reasonable grounds, to exceed them or perhaps to fall short of them.

In addition, he must outline what he considers will be the differences in the cost of his particular section, and if it is anticipated that a new type of job will be marketed and that additional advertising will be required, he must set a figure at which he considers the job can be satisfactorily done.

I want it to be understood that from now on we are dealing with the body building section only. The same principles apply to each section.

We are presuming that the sales manager has informed us that sales for last year represent the normal expectations of this year as regards the

number of units sold, but that to attain them, a certain new feature is being introduced which will cost us an additional £250 in the year for special advertising.

He is also able to inform us that in last year's figures, a special expenditure on travelling was incurred, which, this year, will be reduced by £50. That information is also stored up and brought into the calculations. The sales manager has now completed all that is required of him at this point and the factory executives give us their picture, which shows that the new feature being introduced will result in experimental work and designing which, it is anticipated, will cost £1,000 and that in addition to the normal anticipation of £2,000 for die and development cost to be written off, all of which is already standing, a further £500 must be provided for so that in all £3,500 development cost is to be written off in the year.

The factory manager also points out that where during the last year on account of congestion in the factory and certain hold-ups in delivery resulting from war conditions, it was necessary to rent additional storage space which cost us £200, the normal anticipation this year is that our own storage accommodation will be equal to the calls made upon it, so that this £200 can be estimated as a non-recurring item this year.

The factory executive also reports upon materials, specifications and labour cost, setting out just where they expect to improve on last year's production, or where and for what reason they expect to have higher costs to meet in the production period ahead.

The up-shot of the whole thing is that it is estimated that expenses will be reduced by £250 in some quarters and increased by £1,750 in other quarters, so that a net increased expenditure of £1,500 is likely to become necessary in producing the same quantity of product.

This means, of course, that the units produced, it is estimated, will equal the number of units produced last year, but in order to obtain the same results the prices secured for those units must be increased by £1,500.

I would now refer you back to the statement of cost of sales, which reveals that the cost of sales during the year just closed, by way of overhead in the motor body section was £30,285. The estimated reduction during the year ahead is £250, and the estimated increase during the period is expected to be £1,750, so that we must operate with a view to recovering during the period, a net overhead cost of £31,785—that being what we expect for the year just commencing.

ANTICIPATED ALTERATIONS IN GENERAL OVERHEAD

Net Total Overhead as recorded in year ended 30th June, 19—		£30,285
Estimated Reductions during year to 30th June, 19—:—		
Special Travelling Expenses	£50	
Rent of Stores	£200	
		250
		£30,035
Estimated Increases during year to 30th June, 19—:—		
Experimental Work and Designing	£1000	

Die and Development Cost	500	
Advertising (Special re New Models)	250	
		1,750
Estimated General Overhead of year ended 30th June, 19—		£31,785

HOURLY COST ADJUSTMENT

Having adjusted our figures of last year to meet what we expect will be the position this year, both as regards sales and the relative cost thereof, we now proceed to map out such a plan as will enable us to attain the desired results. This of course means that the overhead to be incurred, the wages to be spent and the materials to be used, must all, by means of an organized system be analyzed up to the various jobs to which they relate and eventually charged to the customers by way of sales.

It would only be needless repetition for the purpose of this address, to do this for every single section of the business, so I propose to take the motor body building section and analyze it as a specimen of procedure.

We know from our statement of cost that the net overhead cost for the period of 12 months ended 30th June, 19—, was £30,285. We anticipate that during the year we are approaching, certain of these costs of last year will be reduced and certain others will be increased, the net result of which will be a further cost of £1,500. We must thus set out to recover a total overhead of £31,785 within the period from the 1st July, 19—, to the 30th June, 19—. In our factory we work 44 hours in 5 days, being 4 days of 8¾ hours and 1 day of 9 hours, and to analyze the period from the 1st July, 19—, to the 30th June, 19—, we prepare the following statement:—

SUMMARY OF WORKING HOURS

1st July, 19—, to 30th June, 19—.

Month.	8¾-hour Days.	9-hour Days	Holidays
19—			
July	18	5	———
August	18	3	1—Exhibition.
September	18	4	———
October	18	5	———
November	16	4	———
December	14	4	6—Christmas and Leave.
19—			
January	15	4	3—New Year and Leave.
February	16	4	———
March	16	4	2—Easter.
April	16	5	1—Anzac Day.
May	16	4	1—Labour Day.
June	17	4	1—King's Birthday.
	197	49	

197 x 8¾ = 1723¾ hours
49 x 9 = 441

216¾ hours.

Work on 2,164 hours, of which 90% only is effective production time.
Overhead Cost to be recouped—£31,785.
Production Hours—1947.6.
Cost per Production Hour—£16/6/5.

We find that there are 197 working days of 8¾ hours and 49 working days of 9 hours, that is, after making an allowance for all holidays. Thus, we have a total of 2164¾ actual working hours in the period, and in those working hours we must recoup an overhead cost of $31,785.

However, we find that, for reasons explained later on, the whole of this 2164 hours is not definitely productive, but only 90 per cent. of it. This means that a calculation must be made so that the costs of 2164 hours running is recouped in 90 per cent of 2164 hours, that is, 1947.6 hours. We find that £31,785 has got to be recovered over 1947.6 hours, and ignoring the odd decimals, this gives us £16/6/5 per hour to run this section of the factory. If this point had been omitted and the cost of running the factory had been based on the total hours of operation, ignoring that 10 per cent of the hours are not definitely productive, we should have been costing at £14/13/5 per hour instead of £16/6/5 per hour, losing 10 per cent of our £31,785—an obviously large sum to overlook.

You will notice that this is based on a perfectly normal working program of 44 hours in a week. You will readily understand that if we were setting out on an abnormal program working, say, two shifts a day, the whole question of overhead cost would have to be reconsidered in the light of that abnormality, and also the number of working hours would be increased accordingly. As things are, the normal program sets out to work normal hours each day and recover the normal overhead cost in those hours during the period of a year.

It is an interesting sidelight to just mention that, presuming at some times, it is necessary to work small amounts of overtime, the overhead cost in the factory would not increase noticeably, because, of course, such small excess hours are the normal thing in an ordinary business—they were present in the year the figures of which we are using as a basis—and the overhead we have ascertained would be the overhead resulting from conditions embracing small departures from regular hours. Thus, the whole of the overhead is recovered during the ordinary daily shift, and, generally speaking, hours worked in excess of this time really incur no overhead at all. Be careful, however, to keep in mind that this can only be applied to small excesses of hours, where, perhaps, it is necessary once or twice in a month to work through until 9 o'clock at night or to work a Saturday morning. Definitely, it would not be so if overtime were to become a regular thing so that the working hours each day were, perhaps 12 instead of 8¾. If such a position arose, it would be necessary to readjust overhead costs accordingly.

I will now leave this question of overhead analysis temporarily, as it is brought in again after we have considered the question of hourly wages cost and to summarize, I would repeat that each effective running hour of this department has been calculated to cost us £16/6/5.

LABOUR EXPENDITURE AND WAGES

Expenditure on wages falls into a number of quite distinct classifications. There is, of course, the actual production labour engaged in the factory, which, by the way, becomes the basis from which, eventually, the hourly burden rates are going to be constructed.

Then, there is the wages of storemen who are not in the true sense, productive. The wages of factory supervisors and draughtsman, carters, caretakers, cleaners, all of which are items of cost, but none of whom return daily time cards recording hours to be charged to specific jobs as part of the cost thereof. Many of these we have already taken care of in the overhead analysis, and at the moment, we are only concerned with the wages of men actually engaged on production. Here we find tradesmen of various types together with juniors and apprentices receiving dozens of different rates of pay, according to the trade which they are carrying on.

We have blacksmiths, welders, apprentices, body builders, panel beaters, press operators, painters, trimmers, and a host of others, and as it would not be possible or interesting to go through the lot, I propose, from this point, to work with the body building section only, which embraces the trades of wood machinists, motor body builders, metal press operators, panel beaters, motor painters and motor trimmers and apprentices in each trade, and labourers.

Briefly, the structure can be sketched out as follows:

A factory supervisor, who does nothing else but supervise, is in charge of the whole section, and his wages are taken care of in the wages and salaries group of overhead charges. Under him, is a working foreman and the various operatives with their apprentices and some labourers. The working foreman records his time expenditure on each job, and, is, therefore, in the same classification as the men actually engaged in producing. He is not always referred to as a working foreman, but often as a leading hand; thus, where you have 33 panel beaters employed, 1 panel beater is a leading hand panel beater and takes charge of the others. Similarly, with body builders or painters, and each leading hand is responsible to the factory supervisor, and if the supervisor is dissatisfied with anything being done by any man in the group, he complains to the leading hand, not to the man direct, and it is the duty of the leading hand to be able to offer any explanation which may be just and reasonable or else to rectify the trouble complained of. Thus, it will be seen that the factory supervisor's wages belong proportionately to every department. Those of the leading hand are precisely the same as the ordinary factory operatives. Labourers do not record time against jobs so their wages cost must be recovered proportionately by other operatives.

We now must consider two important factors which have got to be dealt with in arriving at the wages rates which apply in the factory.

If a man receives £5/10/- for 44 hours in a week, this does not by any means indicate, as would at first be thought, that he costs us 2/6 an hour. Actually he gets paid for 44 hours attendance at the factory each week.

In addition, a certain amount accrues to his credit by way of holiday pay each week. I am dealing with holiday pay now from the view point of the application of State awards.

FACTORY COSTING—PART II.

We must now proceed, by means of the collection of statistics, to find out just how much of that 44 hours for which we pay him, is directed towards effective production and careful analysis of the time records coming in from the factory will probably reveal that approximately 10 per cent. of time paid for is lost. When I say "lost," I do not exactly mean it is unaccounted for. The term "lost" is here meant to imply that this 10 per cent of time is not directed to actual production.

There are hundreds of ways in which this loss can arise—many of them can be rectified, but just as many cannot. Tools must be sharpened, brushes cleaned, machines will break down, supplies just won't arrive in time, workmen will spoil parts, and a host of other factors creep in, none of which can be charged to your customers—not as direct charges anyway—so we must just provide for them by other means.

From the statistics we learn that something in the vicinity of 10 per cent of the time spent by workers at the factory does not get charged to the jobs of customers. People used to repetition work producing large quantities of standard product don't have this trouble to face—not nearly to such an extent as we do in jobbing production, where so many special features present themselves.

However, to return to our calculation—

Each employee is entitled to two weeks holiday each year, and it is the intention of the awards that the employee shall actually be absent from work for those two weeks as compared with his receiving payment in lieu—there are just 50 effective weeks left—so that holiday pay is the equivalent of 4 per cent.

Our 30 pence per hour thus rises to 31.2 pence per hour. Proceeding further, we now realize that 31.2d. is the cost of 1 hour's attendance at the factory, but as only 90 per cent of that hour is effective for the recovery of overhead and other cost, we must fix a rate that will recover for us in 90 per cent of 1 hour the cost of 1 hour's attendance.

If 31.2d. is the cost of 90 per cent of 1 hour, then what is the cost of 100 per cent of 1 year and this proportion sum ends at 34.6 pence per hour.

We now begin to see why the amount of wages drawn weekly or hourly by operatives is not necessarily any guide to the amount which it actually costs us to have those operatives on the premises—even from a wages cost point of view only.

In the factory, there are operatives in similar classifications doing the same work who draw slightly different rates of pay. Supposing an award rate is £5/10/- weekly—there are bound to be men in the factory who receive £5/15/- or £5/17/6, and for obvious reasons, this must be so. Their work, however, is identical—possibly one is faster than another or does his work with a better finish. The customer, however, is not interested in internal matters such as these, and he will expect a uniform price to apply when he gives repeat orders for the same goods. We cannot explain to the customer that he must pay extra this time for his work, because Bill Jones who did it got 5/- per week more than Tom Smith who did the same work last week.

The alternative is, of course, to get down to the average wage rate which must be paid for operatives all doing the same class of work, and in the

process, we shall also take up the loading caused by holiday pay, unproductive time and unproductive labour.

I would now refer you to the small Exhibit Four which shows the division of labour into groups.

The basis underlying the division of the operatives largely follows the classification set out in the wages award, and in our industry, 7 main groups emerge from the sorting out.

Group (1) contains journeymen in the principal trades at the standard award rate of pay and embraces the leading hands and those men who, by virtue of greater skill, etc., have merited a wage a little beyond the average.

Group (2) contains journeymen in a class not quite so highly skilled and whose rate of pay is less than that of the operatives in group (1).

Group (3) is allotted to labourers and the whole of the cost of this group is to be spread over the other groups because the labourers, as previously mentioned, do not make any record of their time to enable it to be definitely allocated against each job.

Group (4) contains female sewing machinists.

Group (5) is allotted to press operators which is a highly skilled section.

Group (7) is allotted to apprentices in the first four years of their training; and

Group (7) contains apprentices in the last year of their training, and of these 7 groups, 7 are definitely groups of productive workers, embracing in all 354 workers.

Each group is calculated on the total wages payable to the operatives employed in that group for 1 hour's attendance at the factory. We then add the 4 per cent loading which accrues by way of holiday pay for each hour's work.

We next divide up the cost of labourers who are not productive workers over the principal groups of journeymen operators — if the amount involved were of any magnitude we should spread this over the total of the groups, but as it can reasonably be anticipated to represent an insignificant portion of the wages bill, it is satisfactory to divide it up over the major groups.

The basis of division is the average number of men employed in each group taken over the full period of 12 months which has just closed. There are 252 operatives in groups 1, 2 and 5, and the basis of division is 234/252, 11/252, and 7/252. The amount is 4/5, and the division comes down to group (1) 4/1, group (2) 3d., and group (5) 1d.

This gives us the hourly wages bill for each group, but as this is based on their hour of attendance at the factory as apart from their hour of production, still further adjustment is necessary. For every hour spent at the factory only 9/10ths eventually reaches the customers job tickets, and is charged up to them, so we must regard the hour's attendance cost as only 9/10ths of the cost of the cost of a productive hour. A further 1/9th of this figure must now be added to reach the cost of each productive hour in each group. Thus, we find the cost of a productive hour in each group to calculate out on the average as follows:—

Group	(1)	234	operatives	cost	£35	3	5	—average	3/-
"	(2)	11	"	"	1	9	3	"	2/8
"	(3)	—							
"	(4)	4	"	"	0	6	0	"	1/6
"	(5)	7	"	"	1	3	11	"	3/5
"	(6)	78	"	"	3	6	8	"	11d.
"	(7)	20	"	"	1	14	10	"	1/9

These calculations are to the nearest penny. I have stated them so, in order to make the basis as plain as possible without confusing the issue with a host of decimal or fractional figures. In a practical set-up, accuracy is of the greatest importance.

I would refer you to the main group of employees where 234 operatives are engaged. The award rate for their work is 2/6 9-11, but after the loadings are added for holidays and unproductive time, their actual wages cost to us is 3/- per hour.

I hope I have made this particular part clear. It is one of vital importance and the knowledge of what factory processes cost is the very life of manufacturing, but it is not quite so easy to get at, as these few sheets of lecture would suggest.

There is one point connected with the wages average which I did not mention; that is, the necessity to keep check not only of the weekly average number employed, but the weekly average wage rate.

There will always be varied rates of wages for the same type of work, but will generally be found that the standard or award rate predominates, and while this is so, no troubles will arise. If, on the other hand, practically all wages exceed award rates, and the standard award rate becomes a minority, then it will readily be seen that if we have based our average wage rate on a calculation where the standard or award rate is in the majority, we shall be short-recovering by way of wages. For this reason, it is essential that a weekly check be kept to see that the balance between the various rates remains fairly normal.

I have found, in practice, that very little effective variation does take place under normal circumstances, and, of course, everybody will understand that if the basic rate suddenly rises, then all wage rates will rise accordingly, and a new calculation to meet the changed circumstances will be necessary.

We have now ascertained the hourly cost of factory operatives from the wages point of view, and we must now see just what lies ahead.

HOURLY CHARGING RATE

It is found expedient in many manufacturing concerns to arrive at a cost of the goods by the use of what is known as an hourly charging rate or hourly burden rate.

This is an hourly rate which sets out to recoup the wages cost and a certain proportion of overhead cost each hour.

This is only one way of recouping the overhead—another very common one is to add a certain fixed percentage on to wages cost and call it overhead, but I believe the Hourly Burden Rate to be a much more accurate and much more scientifically correct method of arriving at the cost to manufacture a product.

The Hourly Burden Rate may be something in the vicinity of, say, 6/- or 7/- per hour. It represents a certain amount, say, 3/- an hour for wages and the remainder for overhead. The idea is that every hour recorded by an operative in a certain hourly wage group shall be charged to the customer for the purpose of calculating cost at a fixed rate. It will, therefore, be seen that the basis is so much for wages and so much for overhead, which immediately brings us to the problem of how much for overhead. We have already worked up how much for wages.

Referring right back to the earlier part of our address, we found that the hourly overhead cost of the section with which we are dealing was £16/6/5 per hour.

Just as an imaginary case, supposing we only had one workman in the factory and the overhead was just the same it would mean that in addition to his wages, he must earn £16/6/5 per hour in order to cover the cost of operating the factory. If, on the other hand, we had two operatives, they would each require to earn £8/3/2½ per hour, in addition to their wages, and you can see that the more operatives there are, the less amount of overhead each is required to recover.

For a moment, I would like to digress and just explain that there are two well recognized ways or spreading this overhead.

One is the way which I propose to explain in detail, that is, by a Flat Hourly Burden Rate and the other is by means of what is known as a Machine Hourly Rate.

I will briefly sketch the Machine Rate, as it is of interest but it is not the system which I follow. I would ask you in listening to this part of my address, to bear in mind that this is a brief sketching of the Machine Rate.

The application of machine rate mainly concerns factories where practically all the processes are machine processes.

In setting out to establish machine rates, the underlying basis is that the total cost of running the factory is attributed to the various mechanical processes and the machines involved therein, and each machine is expected to earn its own proportionate cost.

Each machine is separately valued, and the expenses attributable to that machine on the basis of its value in comparison with the total value of the whole plant, are all put together. These would include as an outstsanding example, depreciation, any repairs or replacement parts necessary as attributable to that machine direct and all expenses of this type.

We find out how much floor area it occupies in relation to the total machine floor area. We assess against the machine its proportion of rent, rates, etc., according to the square feet of floor space required for its operation.

We then assess other charges in a similar way. Many can be directly attributed, such as insurance, and throughout, it is our endeavour to directly attribute against each machine as many of the costs applying to that machine as we reasonably can.

There is, of course, some overhead which cannot be definitely attributed to each machine, and a suitable formula must be arrived at to enable us to make the distribution.

Having ascertained the costs applying to each particular machine, we

now refer to our budget, and find out what our estimated hours of running that machine are to be in the year, and we assess our hourly recovery accordingly.

This is a very straightforward method, but it involves a lot of caculation, and although I am not endeavouring to explain this particular method of charging in the main portion of the address, I merely mentioned it as a matter of interest.

My method of charging is on the Flat Hourly Rate. My reason is that our processes are 75 per cent manual operation and 25 per cent machine operation. Many sections of the factory have no machines at all, such as body mounters, whose only machines are a few nut runners and pneumatic screw drivers or pneumatic drills, and there are dent knockers in the repair section where no machines are ever used. Therefore, we must set out to recover this overhead from the productive work of the whole of the operatives employed, levying such an amount as will give an amount of £16/6/5 for each average hour's operation. We cannot, however, just add up the total number of operatives on any day and divide them into the hourly cost, and call the figure we arrive at the amount recovered by each operative, because Groups 4, 6 and 7 cannot be classified as full operatives—they consist of female workers and apprentices.

As regards Groups 4 and 6, we consider 2 operatives in those groups equal to 1 journeyman—with Group 7, consisting of advanced apprentices, we consider that 3 apprentices are equal to 2 journeymen.

Another thing we cannot do is check up any wages sheet and add it up even with these adjustments, and adopt it as the basis, as each wages sheet differs to some extent as regards the numbers employed in each group.

What we do, therefore, is to take the wages sheets over the period of 12 months just ended and prepare an analysis showing the average number employed each week in each group, and I am presuming, on doing this, we find—

Group 1	Average	231
" 2	"	10
" 3	"	2—but is not to be included in the calculation.
" 4	"	4—but which is included in the calculation as 2 on the basis of 1 to 2.
" 5	"	6
" 6	"	74—and is to be included for 37.
" 7	"	21—and will be included as equal to 14.

That gives us a total of 300 units into which the overhead is to be divided, and it is to be allotted to the various groups in the proportion of 231/300ths, 10/300, 2/300, 6/300, 37, and 14/300ths respectively.

We now calculate this down on the basis of £16/6/5, and get 13.06 pence per unit, which, multiplied by the number of units, gives—

£	s.	d.		
12	11	4	to be allotted to Group Number	1
0	10	11	" " " " "	2
			" " " " "	3
0	2	2	" " " " "	4
0	6	6	" " " " "	5

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

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ATTENTION!

From time to time we receive requests from our Western Chapters to have Eastern members who may be visiting the West, call on our Chapters there. Any member who can address the Chapters and is willing to do so will be doubly welcomed, but members who merely wish to pay a courtesy call will receive a royal welcome. Remember the fellows out West are far away from Headquarters, and a visit on your part when in the vicinity will do a lot to help them.

2	0	3	"	"	"	"	"	6
0	15	3	"	"	"	"	"	7

Supposing that there were only one operative in each group, there would be 6 operatives at a certain average wage rate, plus the amount of overhead allotted to their group, and it must be obvious that for an hour's productive work, they must earn their average wage rate of their group, plus the full overhead.

If there were two operatives in each group, each must earn the average wage rate plus half of the group's allotment of overhead, and so on.

We know that in each group there was a certain average number employed last year, and we prepare a scale showing the allotment of the overhead on the basis of the number of men employed. In the case of Group No. 1, if there were 231 men employed, each would have to earn the average wage rate of the group, namely 3/-, plus 13.06 pence, and if the number is greater, the amount of overhead which each must earn is slightly less, whereas if the number falls, the overhead to be earned is slightly more.

Personal Notes

Congratulations to Stan Stott, a prominent member of the Hamilton Chapter who was recently promoted to the position of Assistant Secretary of the International Silver Company.

Walter H. Furneaux is being installed as Worshipful Master of his lodge on January 11th. A deputation from the Society will be present at the installation.

Donald T. Knight of the Hamilton Chapter was recently commissioned as a Lieutenant in a Machine-Gun Regiment in the Canadian Active Army and is at present in a training camp in the Province of Quebec. Good luck, Don.

Alex Blanchard, of the Toronto Chapter, who was with the Treasury Cost Section is back with his old firm, Service Station Equipment Limited.

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